論文内容の要旨

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This thesis is described from viewpoints of novel cellulose hydrogel films prepared from waste fibers for biocompatible and cytotoxic applications. Thus, this consists of eight chapters as following. **Chapter 1** has presented a brief introduction to hydrogel. Here are introduced concepts of hydrogels composed of mainly biopolymers used in this thesis, especially in importance of cellulose as possibility for the scaffold film in tissue engineering. **Chapter 2** relates to the effect of sodium hypochlorite treatment of agave tequilana weber bagasse fibers for preparation of cyto and biocompatible hydrogel film. In this chapter, Waste bagasse of *Agave tequilana*-Weber fibers was chemically treated with sodium hydroxide to elaborate hydrogel films. The concentration of the sodium hypochlorite used in the chemical treatment affected the color of the fibers by changing from brown to white. Analysis of the morphology of adherent NIH3T3 fibroblast indicated that the projected cell area, aspect ratio and long axis gradually increased with the increment of sodium hypochlorite content in the agave treatment. **Chapter 3** describes fibroblast compatibility on scaffold hydrogels prepared from agave tequilana weber bagasse for tissue regeneration. In this chapter, gave fibers were used to elaborate a transparent and flexible cellulose hydrogel films used as scaffold for tissue regeneration and tested by *in vitro* assays with NIH 3T3 fibroblast cells. Using dimethylacetamide/lithium chloride (DMAc/LiCl) system was possible to obtain cellulose solutions and hydrogel films were prepared by phase inverse method without cross-linker. The prepared agave cellulose films showed better cytocompatibility than the PS dish used as control. AFM images showed that the hydrogel films with lower LiCl apparently contained ordered and aggregated fiber orientation. This comparison suggested that the segmental microstructure in the hydrogel films influenced

fibroblast cells spreading. **Chapter 4** shows bamboo fibers elaborating cellulose hydrogel for medical applications. In this chapter, bamboo fibers were used as source to prepare cellulose hydrogel films for cell cultivation scaffold. The preparation of cellulose solutions was carried out by three different dissolving methods with NaOH-based and NaOH/urea aqueous solutions and DMAc/LiCl solution. The obtained results with DMAc/LiCl also were seen to be higher than the reults for PS dish used as control. However, low cytocompatibility was observed when NaOH and NaOH/urea methods were used. The obtained results showed that hydrogel films elaborated with cellulose solution prepared with DMAc/LiCl method exhibited good cytocompatibility for the cell cultivation scaffold. **Chapter 5** relates to wooden pulp cellulose hydrogels having cyto and biocompatible properties. This chapter focuses in the preparation of hydrogel films from pulp fibers. The cell grown area on the hydrogel surface was significantly higher than the observed on the commercial PS dish used as control. These presented that the cellulose hydrogel films prepared from wooden pulp exhibited good cytocompatibility for application of tissue engineering. **Chapter 6** shows biohydrogels interpenetrated with hydroxyethyl cellulose and wooden pulp for biocompatible materials. This chapter describes the elaboration interpenetrated hydrogel films using pulp fibers and hydroxyethyl cellulose to determinate the effect on cytocompatibility. **Chapter 7** presents fibroblast growing in several cellulose hydrogels made of agave, kenaf and conifer. Finally, **Chapter 8**, conclusion of my doctoral thesis is summarized in addition with suggestions for future works addressed by the uses of natural fibers to elaborate films for medical applications.